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ABSTRACT

Until recently, empirical literature has focused on the effects of homework regarding specific subjects, rather than overall achievement. This study attempts to fill this void by comparing number of hours and number of homework days to three dependent variables: competency test scores, achievement test scores, and teacher-assigned grades for third- and sixth-grade elementary school children. A stratified sample of 7,690 third- and sixth-grade students from 51 school corporations in Indiana was identified. Surveys were distributed to the parents of all children whose records were located. The return rate was 56 percent. Data on each child's grades, group achievement test scores, and general cognitive ability were obtained from district files; Indiana Basic Skills Competency Test (IBSCT) Scores were obtained from the state department of education. Results showed a weak relationship between students' homework practices and their grades, IBSCT scores, and achievement test scores. The correlation proved slightly negative for the third graders, indicating that as homework increased, grades decreased. Study results must be interpreted cautiously. Since the homework data were based on surveys completed by parents, the actual amount of homework completed may have been under- or over-estimated. Future research should use a longitudinal perspective to scrutinize the contribution of various homework categories to student achievement. Included are 4 figures and 27 references. (MLH)

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Relationship of Academic Performance to Parent Estimate of Homework Time[1]

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Running Head: HOMEWORK

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Abstract

A stratified sample of 7,690 third and sixth grade students from 51 school corporations was identified. Records were located for 86% of the sample. Surveys were distributed to the parents of all children whose records were located. The return rate on the parent survey was 56%. Data on each child's grades, group achievement test scores and general cognitive ability were retrieved from the district files. Their scores on the Indiana Basic Skills Competency Test (IBSCT) were obtained from the Indiana State Department of Education. There was a weak relationship observed between students' homework practices and their grades, IBSCT scores, and achievement test scores. The correlation was slightly negative for the third graders, indicating as homework increased, grades decreased. Interpretative cautions and recommendations for future research conclude the paper.

Relationship of Academic Performance to Parent Estimate of Homework Time[1]

Homework has often been seen as a prescription for many ills of the educational system. These maladies include poor achievement scores, poor school grades, and claims that the American public educational system is no longer superior to those of other countries. Knorr (1981) pointed out that there have been approximately 500 articles on the subject of homework. She noted that many of these writings were based on popularized notions which were the products of the educational climate at the time of any given writing. The literature on homework may be categorized into philosophical, descriptive, correlational, and experimental studies.

Learning theories from the early part of this century explained the importance of homework as exercise for the brain. In his monumental work The Principles of Psychology, William James (1890) described the mind as "pudding or mortar" that must be fashioned by outside forces. The most important of these forces was exercise for the muscle of the brain. James (1890) wrote that exercise produced known paths for the "nervous-current". Homework was an exercise that strengthened the mind.

Bogges (1931) suggested that homework has two fundamental objectives, to add to the students' store of useful knowledge and

to form good work habits. Crawford and Carmichael (1937) wrote that "freedom at night cultivates lazy habits," and Myers (1934) believed that if homework was not given as early as in the fourth grade, it would be difficult to introduce homework at a later date. The following is a brief list of advantages of homework for children, which are based on the authors' own experiences and personal biases:

(a) Homework develops self-discipline and a sense of responsibility (Crawford & Carmichael, 1937; Goldstein, 1960; Check, 1966; Austin, 1979; McDermott, Goldman, & Varenne, 1984).

(b) Homework stimulates independent study habits and learning (Shaw, 1965; Check, 1966; Austin, 1979).

(c) Homework teaches constructive use of leisure time and how to budget time (Vincent, 1937; Jones & Ross, 1964; Shaw, 1965).

(d) Homework allows children to explore their own interests, and when homework is individualized, it allows children to work at their own ability level (Check, 1966; Shaw, 1965).

In contrast to those who reported that homework was relevant and valuable to the learner were the authors who considered homework to have a negative influence on children. Examples of this position are presented in the following list of disadvantages:

(a) Parents or siblings who help with homework may be more of a hindrance to the child than a help, since they may either do the work themselves or teach the child how to do it incorrectly (Myers, 1934; Vincent, 1937; Crawford & Carmichael, 1937; Check, 1966; Maertens & Johnston, 1972; McDermott et al., 1984).

(b) The home is often a poor work environment because of poor lighting, lack of adequate space and interruptions. Therefore, children may not be able to complete homework for reasons that may not be under their control (Crawford & Carmichael, 1937; Jones & Ross, 1964; Kerzic, 1966; Gerry, 1970; Austin, 1979; Patton & Stinard, 1983; McDermott et al., 1984).

(c) Children are not able to spend time with their family in the evening or on weekends (Crawford & Carmichael, 1937; Jones & Ross, 1964; Arnold, 1965; Check, 1966; Check, 1980; McDermott et al., 1984).

(d) Homework is only useful if it is individualized or is in specific subjects; otherwise, it may become useless copy and drill work (Bond & Smith, 1966; Lee & Pruitt, 1979; Check, 1980).

The common sense approach of the previous authors contrasts with that of investigators who conducted empirical studies. Typically, empirical studies have addressed the benefit of homework

on academic achievement as measured by grades, teacher constructed tests, or group administered standardized achievement tests. Austin (1979) in a review of empirical research regarding mathematics homework found:

(a) homework is beneficial for fourth through tenth grade students;

(b) computational skills may be improved;

(c) problem solving skills may or may not be improved;

(d) and drill homework may not be useful.

Other methodologically sound studies have drawn additional conclusions concerning the value of homework. Different approaches were utilized to obtain this information (e.g. supervised versus unsupervised, homework versus no homework, and different amounts of homework). Rosentengel and Turner (1936) compared the achievement of sixth grade students in supervised and unsupervised study groups and found that the unsupervised group obtained higher mean increases in their health test scores. Another study concluded that homework was not significantly beneficial for fifth grade students in English, geography and arithmetic (Vincent, 1937).

A different conclusion concerning the value of homework was drawn by Anderson (1946). The results of his study indicated that eighth grade students at all ability levels evidenced greater achievement with homework than without homework in the areas of English, social studies and math. Recent studies, conducted

concerning arithmetic homework, by Gray & Allison, (1971)and Maertens, (1969) indicated that there was no significant difference in mathematical achievement for those elementary school students who did homework versus those who did not. Koch (1965) compared the arithmetic achievement of sixth grade students who received long, short, or no homework assignments. Of the three groups, the students who were given long daily assignments achieved the highest on the arithmetic concepts/computations section of the Iowa Test of Basic Skills.

In a study concerning the amount of homework and the academic achievement of high school students, Keith & Page (1985) concluded that there was a significant relationship between the two variables, meaning that as the amount of completed homework increased, the student's academic achievement also increased. However, the correlation between the amount of homework and achievement (.113), and the correlation between the homework and grades (.192), seem very low even though they are reported as significant. In addition, the correlations were calculated between the amount of overall homework and overall achievement, instead of homework and achievement in each subject area. Therefore the correlation might not show the relationship between the amount of homework done in one subject area and the grade received in that subject area.

Until recently, empirical literature has focused on the

effects of homework regarding specific subjects rather than overall achievement. Very few recent studies have been undertaken to support or refute the value of homework in relation to overall achievement. Even though Keith and Page conducted such a study, they only included secondary level students. The purpose of this study was to partially fill this void by comparing number of hours and number of days of homework to three dependent variables: competency test scores, achievement test scores, and teacher-assigned grades for third and sixth grade elementary school children.

Method

Subjects

A stratified sample of small, medium and large school districts was selected from Indiana's school corporations. From these districts, a sample of students was identified by the Indiana Department of Education. A total of 51 school corporations (6 large, 17 medium and 28 small) comprised the final sample. Participation by the districts entailed completing a school district information form, a pupil/school data form on selected students, and disseminating parent questionnaires to students. The parents returned the survey to Indiana University.

Third and sixth grade students were selected from the 51 school corporations based on their level of performance on the IBSCT administered in February 1986. To obtain a representative

sample of students scoring in the different performance sectors (the upper 15%, the middle 30%, and the lowest 15%) on the competency test, sampling quotas of 20%, 40%, and 40% for the high, middle, and lowest test performance groups were established apriori. Over-sampling was done in the lowest and middle sectors to compensate for the possibility of a low parent survey return rate.

A total of 7,690 students were selected for the study. Of the 7,690 students identified for the study, school corporations were able to locate 6,598 (86%) of the selected students. Approximately 14% or 1092 of the pupil/school data forms were returned with no student information, indicating that either (a) the student had moved, (b) the student's cumulative records were not available, or (c) the corporation was unable to locate the student due to redistricting. Parent participation was measured by the number of parent surveys returned. A total of 6,598 surveys were distributed; 3730 (or 56%) were returned to the project site.

Procedure

School district based test coordinators were responsible for locating students' cumulative records and recording information requested on individual student code sheets. All student code sheets, including those cases where students had moved or for whom records were unavailable, were returned to the project site. In addition, test coordinators identified the students' current

teacher and distributed parent envelopes to the teacher to be sent home with the child. Parent envelopes contained a letter describing the study, the parent survey, and a pre-paid self-addressed return envelope. Data on gender, Chapter I participation, and IBSCT performance were available on tapes from the Indiana Department of Education. Tapes were used as the medium for transferring the data. Information requested from the corporations was limited to data not available from the Department of Education.

Instruments

Two survey instruments were developed to collect individual data on students: (a) the pupil/school data form and (b) the parent survey form. The pupil/school data form was designed to obtain information on the student's educational background (e.g., group administered achievement test scores and teacher assigned grades). The parent survey form addressed the student's family characteristics (e.g., marital status of parents, number of parents/siblings in home, parents' education), as well as information pertaining to homework.

The Iowa Tests of Basic Skills was the most frequently used group administered measure of achievement. Results from this test were reported for 38.6% of the third graders and 46.0% of the sixth graders. The Comprehensive Test of Basic Skills was the second most prevalent measure: 24.8% of the third grade and 22.2% of the

sixth grade sample had achievement scores based on this instrument. Other frequently used measures were the Stanford Achievement Series (14.5% for third and 14.1% for sixth graders) and the Metropolitan Achievement Tests (4.8% for third and 4.3% for sixth graders).

Results

Homework (defined as the number of days of homework per week, and also as the total number of hours of homework per week) is poorly associated with IBSCT scores, teacher assigned grades, and achievement test scores. Between the two homework measures, there was a moderate correlation of .39 for third graders and .45 for sixth graders. In the case of third grade students, the relation of homework to academic performance was paradoxical to what would have been expected (see Tables 1 and 2). Results indicated that less homework was associated with higher academic performance and more homework was associated with lower academic performance. The mean correlations of parents' estimates of days per week of homework and hours per week of homework with IBSCT composite score, teacher assigned mean grade, and group achievement test composite score were approximately -.20 and -.16, respectively. In contrast, IQ correlated at a higher level with the three academic performance measures (.57, IBSCT scores; .60, grades; and .68, achievement test scores). When the results are broken out by IBSCT groups, the correlations between IQ and IBSCT Writing and IBSCT Math scores for

the middle and high groups drop due to the restriction in range. The correlations with the high group drop due to the design of the IBSCT and the truncation of scores at the upper end of the distribution.

Insert Tables 1 and 2 about here

In the case of sixth grade students, only minimal relationships between homework and measures of academic performance were observed. Once again, IQ correlated higher than homework did with IBSCT scores, teacher assigned grades, and achievement test scores. These correlations were even higher than those discovered for the third grade students. As was mentioned for the third graders, the correlations for the sixth grade middle and high groups between IQ and IBSCT Writing and IBSCT Math scores, were lower than all but one correlation between IQ and academic performance measures for sixth graders. In correlating homework measures with teacher assigned grades for third graders, the relationship was almost nonexistent (.02) for the low group and minimally negative (-.07, -.09) for the middle and high groups. For the sixth graders, there was no systematic trend when correlating homework with grades.

To further explore the apparently paradoxical relationship of homework and IBSCT performance, the relationships between teacher

assigned grades and homework were graphed in figures 1-4. Figure 1 reveals that for third graders there was not a consistent or generalizable relationship between parents' estimates of children's time spent doing homework and teacher assigned grades. Figure 1 shows that for the middle and high groups the more time spent doing homework did not result in the expected increase in grades. For the high group grades decreased slightly as the amount of homework time increased. This was true up to the category of "10 or more hours". At that point higher grades were associated with an increase in homework time. For the middle group the trend was comparable: grades decreased as homework increased from 1 to 10 hours. The exception from this trend was a sharp jump in grades from 0 to 1 hour of homework. This trend was also noted for the low group.

Insert Figures 1-4 about here

Figure 2 reports the trends within the sixth grade sample for composite grades and total homework time broken down by the high, middle, and low groups. It was constructed in a similar fashion to Figure 1. With the exception of one data point, the trends are fairly consistent. Overall, as total homework time increased, students' grades remained the same. This trend held for all three groups.

Figure 3 graphically represents the relationship between parents' estimates for the number of days per week that their child did homework and teacher assigned grades. There was little difference in grades associated with the number of days per week children did homework, except for the middle groups whose grades fell when homework was reported "almost everyday." Figure 3 should be interpreted cautiously because those children doing homework almost everyday may be those who did not finish their assignments during class time. Figure 4 reports the trends for sixth graders' teacher assigned grades and days of homework reported by students' parents. The results graphed in Figure 4 reveal that as the number of days of homework increased, the teacher assigned grades changed slightly.

Discussion

For third and sixth grade students there was a weak relationship between the amount of time spent on homework and academic performance, as measured by IBSCT scores, teacher assigned grades, and achievement test scores. In contrast, there was a strong positive correlation between cognitive ability and these academic performance measures. The child's general cognitive ability is a more accurate predictor of academic performance than homework.

For the third grade students, the relationship of homework to the three measures of academic performance was minimal, but

negative. The negative correlations found for the third grade students were not what would have been expected. One reason why these results occurred may be that students with lower grades are doing a large amount of homework, but are doing it incorrectly. If teachers do not always grade the homework and the students are doing it incorrectly, unbeknownst to them, they may learn incorrect solutions and information. When subsequent mastery tests are administered by the classroom teacher, information given by the students is therefore incorrect and their grades are lowered.

Another unexpected finding was that the correlations between homework (total time and days per week) and IBSCT scores appeared to decrease as a function of IBSCT group. The low group, those scoring below the 15th percentile, appeared to have the strongest association between homework and IBSCT. However, the lower correlation observed in the high IBSCT group was a function of the distribution of IBSCT scores. The distribution was truncated, in that the measure was designed to assess children who are having difficulties acquiring basic academic competencies. Since the IBSCT was developed to select children scoring below the 15th percentile, it lacks ceiling items which would adequately discriminate among children scoring in the highest quartile. The resulting restriction of range of IBSCT scores for the high group, and to a lesser degree for the middle IBSCT group, were instrumental in decreasing the correlations with homework to almost

.00. In reference to the IBSCT correlations with homework, the most appropriate indices would be those in which the total group was employed.

The minimal relationship of homework to academic performance may be due to the following aspects of homework. The difficulty level of homework is usually not individualized nor tailored to the student's specific needs. The high ability elementary students may be assigned homework which is not challenging for them, and therefore doing homework may not enhance their academic performance achievement; the low ability students may be assigned homework which is too difficult for them to master, and therefore, spending hours on homework which they do not understand may not increase their academic performance. The amount of homework and the amount of time spent on homework are also factors that need to be considered. For example, it may not matter if 25 or 10 multiplication problems are completed in order for the concept of multiplication to be grasped. If this is true, then the amount of time spent doing more problems may not be related to academic performance. It may also be the case that students with higher IQs take less time than other students do in completing homework assignments. A third aspect that might contribute to the weak relationship between homework and academic performance is that the homework which is assigned - and included in the parental time estimates - may not be related to the academic performance area

measures that were included in this study. For example, the current practice of children memorizing spelling words for a weekly test would not be directly linked to developing reading comprehension, higher order writing skills, or mathematical concepts, which were dealt with in this study. A final possibility of why homework correlated lower than cognitive ability did with academic performance is that all the students could be doing the same amount of work, but the students with higher IQs/achievement may finish most of their work at school (and therefore this would not be included in parental estimates of homework); those students with a lower cognitive ability/achievement may do the same work, but do it at home.

The findings of this study lead to the conclusion that the amount of homework (number of days and number of hours) does not contribute significantly to a child's achievement test scores, competency test scores, or teacher-assigned grades. The results do concur with recent studies which also found relatively low correlations between homework and achievement measures (Walberg and Shanahan, 1983; Keith and Page, 1985; Cool-Hauser & Keith, 1987). As was the case in the Keith and Page (1985) investigation, the general ability measure was the best predictor of academic achievement.

However, interpretation of similar correlations from the most recent work in this area is contradictory. Keith and Page (1985)

interpret low correlations (r =.11 to .16) as significant and an indication that "homework has a meaningful influence on achievement" (p. 356). The results of the present study on elementary school children concerning the relationship of homework to achievement (r = 0.08 or less) suggest homework has less influence for elementary school pupils than for high school students studied by Keith and Page (1985).

Keith and his colleagues have focused on the secondary school population, whereas the present study was a sample from elementary school aged children. Since in the current study correlations between homework and academic performance are low, and in some instances negative, and correlations on high school studies are slightly higher, the effect of homework may be related to achievement according to the child's developmental stage. Homework may be more effective as a child grows older, because coursework becomes more specific and rigorous. Walberg and Shanahan (1983) provide support for this hypothesis. They found that quantity of instruction (defined as number of academic year-long courses such as English, science, mathematics) was a more significant indicator of achievement than homework.

The findings of the present study need to be interpreted cautiously. First the homework data were based on surveys filled out by parents. It is unknown the degree to which parents may have under- or overestimated the actual amounts of homework their

children completed. An additional limitation is that the focus of the present study was on homework defined generically; homework associated with specific subject areas was not investigated.

Future research should scrutinize the contribution of various types of homework to student achievement. For example, Lee and Pruitt (1979) describe four types of homework; drill and practice, preparation, extension, and creative. The role that these categories of homework may play should be investigated relative to acquisition of skills in different subject areas. Those proposed studies will have the greatest likelihood of providing insights and informing educational practices if a longitudinal perspective is adopted.

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Table 1
Correlations of Three Measures of Academic Performance with Homework and Cognitive Ability (Grade 3).

	Academic Performance Measure											
	IBSCT				Teacher Assigned Grades				Achievement Test Scores			
IBSCT Sample	Reading	Writing	Math	Composite	Reading	Writing	Math	Mean	Reading	Writing	Math	Composite
Total												
Homework Days	-.18	-.16	-.20	-.20	-.20	-.17	-.18	-.20	-.22	-.18	-.21	-.21
Total Homework Time	-.14	-.09	-.14	-.14	-.15	-.12	-.12	-.14	-.16	-.17	-.17	-.20
Cognitive Ability	.53	.49	.52	.57	.57	.48	.55	.60	.64	.61	.62	.68
Low												
Homework Days	.07	.01	-.03	.05	.04	.02	.02	.04	.01	.03	.01	.03
Total Homework Time	-.02	.04	-.02	.00	.01	.00	.03	.02	-.03	-.01	-.08	-.04
Cognitive Ability	.15	.19	.26	.23	.26	.18	.30	.32	.26	.25	.25	.31
Middle												
Homework Days	.04	.06	-.03	.05	-.07	-.08	-.06	-.07	-.05	-.01	-.05	-.02
Total Homework Time	-.01	.06	-.02	.00	-.07	-.05	-.06	-.07	-.05	-.05	-.04	-.05
Cognitive Ability	.14	.02	.04	.19	.25	.27	.25	.31	.36	.34	.30	.42
High												
Homework Days	-.02	-.06	-.04	.08	-.13	-.08	-.10	-.12	-.14	-.05	-.09	-.10
Total Homework Time	.10	-.03	-.02	.04	-.13	-.05	-.05	-.09	-.14	.01	-.12	-.11
Cognitive Ability	.13	.02	.01	.12	.33	.21	.31	.35	.35	.27	.38	.44

Note: Homework days refers to the parent estimation of the number of days of homework per week. Total homework time refers to the parent estimation of the number of hours of homework per week. Low, middle, and high refer to the student groupings based on the IBSCT results.

Table 2
Correlations of Three Measures of Academic Performance with Homework and Cognitive Ability (Grade 6).

	Academic Performance Measure											
	IBSCT				Teacher Assigned Grades				Achievement Test Scores			
IBSCT Sample	Reading	Writing	Math	Composite	Reading	Writing	Math	Mean	Reading	Writing	Math	Composite
Total												
Homework Days	.07	.08	.06	.07	.14	.13	.11	.15	.04	.08	.07	.07
Total Homework Time	.01	.00	.00	.00	.08	.10	.04	.09	.00	.03	.01	.00
Cognitive Ability	.69	.64	.71	.75	.59	.53	.59	.65	.79	.78	.76	.83
Low												
Homework Days	.10	.06	.03	.09	.19	.07	.12	.16	-.02	.06	.03	.04
Total Homework Time	-.03	-.07	-.08	-.08	.12	.05	.03	.08	-.06	.00	-.01	-.03
Cognitive Ability	.29	.36	.33	.41	.21	.16	.21	.24	.39	.44	.39	.51
Middle												
Homework Days	-.05	.09	.01	.02	.14	.15	.11	.17	.01	.09	.04	.08
Total Homework Time	-.01	.03	-.01	-.01	.07	.11	.02	.09	.04	.11	.01	.06
Cognitive Ability	.22	.09	.07	.34	.20	.13	.17	.21	.47	.41	.31	.52
High												
Homework Days	-.01	.08	.00	.03	.06	.16	.07	.13	-.02	.11	.08	.08
Total Homework Time	.01	.01	-.02	.00	.04	.16	.05	.11	-.11	.00	-.02	-.02
Cognitive Ability	.29	.09	.16	.36	.21	.21	.24	.28	.51	.49	.45	.59

Note: Homework days refers to the parent estimation of the number of days of homework per week. Total homework time refers to the parent estimation of the number of hours of homework per week. Low, middle, and high refer to the student groupings based on the IBSCT results.

Figure Caption

Figure 1. Teacher Assigned Grades by Hours of Homework per Week by IBSCT Group (Grade 3)

Figure 2. Teacher Assigned Grades by Hours of Homework per Week by IBSCT Group (Grade 6)

Figure 3. Teacher Assigned Grades by Days per Week of Homework by IBSCT Group (Grade 3)

Figure 4. Teacher Assigned Grades by Days per Week of Homework by IBSCT Group (Grade 6)

Figure 1

Teacher Assigned Grades by Hours of Homework per Week by IBSCT Group (Grade 3)

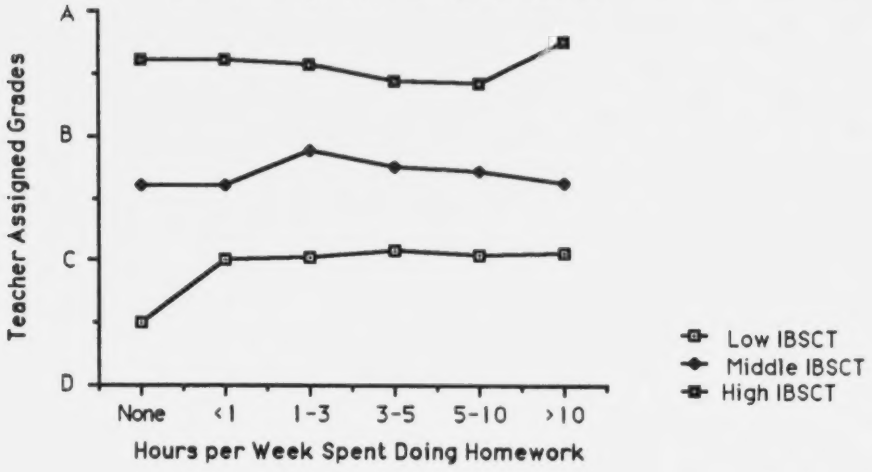

Figure 2

Teacher Assigned Grades by Hours of Homework per Week by IBSCT Group (Grade 6)

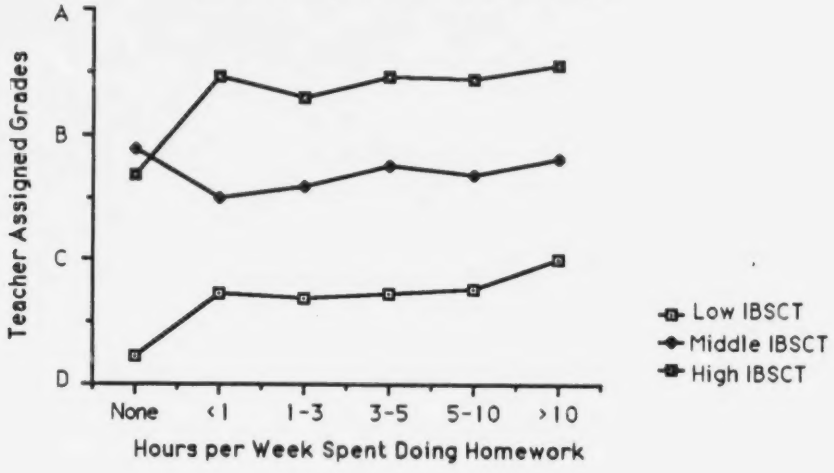

Figure 3

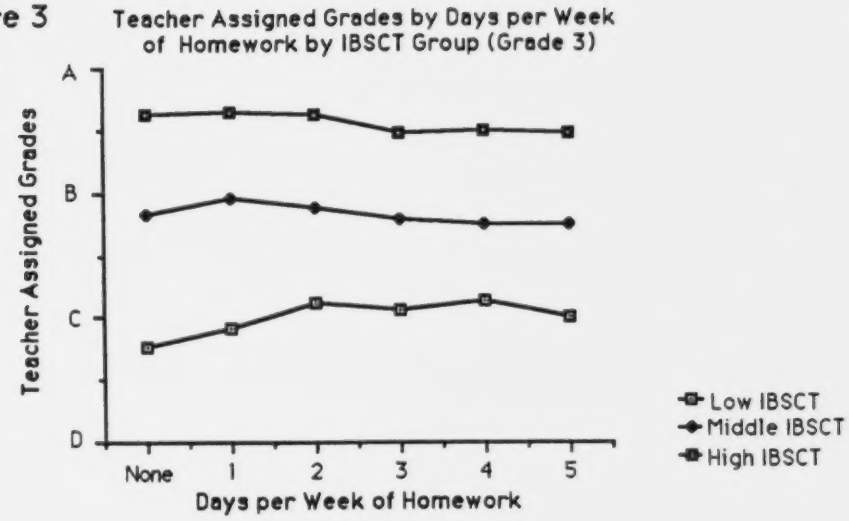

Figure 4